Xiurui Zhao (赵修瑞)

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Research Interests

Active Galactic Nuclei, Extragalactic Surveys, Time-Domain Astrophysics

Fellowships & Appointments

California Institute of Technology, Pasadena, U.S. **2025-**
Postdoctoral Scholar Research Associate, Advisor: Prof. Fiona Harrison, Dr. Daniel Stern

California Institute of Technology, Pasadena, U.S. **2024 Fall**
Visiting Scholar, Host: Prof. Fiona Harrison

University of Illinois Urbana-Champaign, Urbana, U.S. **2023-2025**
Postdoctoral Research Associate, Advisor: Prof. Yue Shen

Center for Astrophysics | Harvard & Smithsonian, Cambridge, U.S. **2021-2023**
Postdoctoral Fellow, Advisors: Dr. Francesca Civano, Dr. Martin Elvis

Center for Astrophysics | Harvard & Smithsonian, Cambridge, U.S. **2020-2021**
Pre-Doctoral Fellow, Advisor: Dr. Francesca Civano

Education

Clemson University, Clemson, U.S. **2016-2021**
Ph.D. in Astrophysics, Advisor: Prof. Marco Ajello
Dissertation: *Heavily Obscured Active Galactic Nuclei in NuSTAR Era*

Lanzhou University, Lanzhou, China **2012-2016**
B.Sc. in Physics, Cuiying Honors College, China's Top-Notch Undergraduate Training Program

Honors and Awards

Clemson University Level Outstanding Graduate Researcher (2 winners each year)	**2021**
Science College Outstanding Graduate in Discovery	**2021**
Physics Department Graduate Research Assistant	**2021**
SAO Predoctoral Fellowship	**2020-2021**
Clemson Graduate Student Travel Grant	**2019, 2021**
Cuiying Honors College Abroad Study Fellowship	**2014, 2015**

Accepted Scientific Proposals as PI

23 accepted X-ray/optical/sub-mm proposals with **$450k** grant as PI.

● **X-ray (2.5 Ms)**

- **XMM-*Newton*** DDT (30 ks) **2025**
  "First X-ray Survey on the JWST-NEXUS Field"
- ***NuSTAR*** Cycle 11 (100 ks *NuSTAR* + 28 ks *Swift*, ToO, $80k) **2025**
  "Probing the electron populations in AGN Corona with NuSTAR"
- ***Swift***-XRT ToO (18 ks) **2025**
  "Measure the current flux of eROSITA detected high-z quasars for NuSTAR follow-up"
- ***NuSTAR*** Legacy Survey of *Swift*/BAT AGN (80 Targests in priority, 720 ks) **2024**
  "Systematically constraining AGN Tori at Different Luminsoties"
- ***NuSTAR*** Cycle 9 (**Large**, 500 ks *NuSTAR* + 142 ks XMM, $130k) **2023**
  "Systematically Constraining the AGN Coronal Properties with NuSTAR Using a Sample of Luminous, High-redshift Quasars"
- ***NuSTAR*** Cycle 8 (**Large**, 600 ks *NuSTAR* + 195 ks XMM, $150k) **2022**
  "Constraining the Properties of AGN Coronae using a Sample of Luminous, High-redshift Quasars with NuSTAR"
- ***NuSTAR*** Cycle 7 (100 ks *NuSTAR* + 60 ks XMM**,** $90k) **2021**
  "Unveiling with NuSTAR the most powerful, heavily obscured, quasar ever discovered in X-rays"
- ***Swift***-XRT Cycle 19 (18 ks) **2022**
  "Build a Sample of Luminous, High-redshift Quasars to Constrain the Properties of AGN Coronae"
- ***Swift***-XRT ToO (3 ks) **2021**
  "Measure the X-ray flux of a rare coronal line event quasar exhibiting another optical flare"

● **Optical (9 nights)**

- **SOAR** 4m Goodman (0.6+0.6 night) **2024B/2025A**
  "Identify X-ray Bright Quasars to Constrain the AGN Coronae"
- **BOK** 2.5m BCSpec (2 night), Co-PI **2024B**
  "Redshifts of X-ray Bright Quasars to Constrain the AGN Corona"
- **MMT** 6.5m Hectospec (0.3+0.3 night**,** 335 sources) **2022B & 2023A**
  "Complete the Hectospec Spectroscopic Survey of JWST NEP Time-Domain-Field"
- **MMT** 6.5m Binospec (0.1+0.1+0.2 night) **2022A & 2022B & 2023A**
  Monitoring a Coronal Line Event AGN
- **MMT** 6.5m Binospec (0.4 night, 6 sources) **2023A**
  Identify X-ray Bright Quasars and Constrain the AGN Coronal
- **SAO FLWO** 1.5m FAST (0.2 night) **2023A**
  Measure the Black Hole Mass of an X-ray Bright Quasar to Constrain Its Coronal Properties
- **SAO FLWO** 1.2m Keplercam (1+1+2 night, *g*, *r*, *i*) **2023A & 2022B & 2022A**
  "Monitoring the Continuous Optical Flares of a Coronal Line Event"

● **Sub-mm (3 tracks)**

- **Submillimeter Array** (SMA) standard science observation (3 tracks) **2022B**

"Mornitoring with SMA a Highly Variable Flat Spectrum Radio Quasar in the JWST North Ecliptic Pole Time-Domain Field"

Collaboration & Professional Service

- Member of ***HEROIX*** AGN Working Group **2025-**
- Member of ***Roman*** Science Collaboration **2025-**
- Member of ***PRIMA*** AGN Across Cosmic Time Working Group **2025-**
- Member of ***HEX-P*** Black Hole Growth & Corona Working Group **2022-**
- Member of ***AXIS*** AGN & Time-Domain Working Group **2022-**
- Member of ***JWST*** PEARLS Working Group **2022-**
- Member of ***NuSTAR*** Extragalactic Survey Team **2020-**
- Member of ***Athena*** AGN Science Working Group **2020-**

- Co-organizers of CfA High Energy Astrophysics Division Seminar **2021-2023**

+ Panelist for NASA ***NuSTAR, Swift*** Proposal Review
+ External reviewer for ***CFHT***
+ Reviewer for ApJ, A&A

Invited Talks

Clemson University, two group Seminars	**Apr 2025**
Caltech, HEA Group Meeting	**Dec 2024**
Caltech, Tea Talk	**May 2024**
Caltech, HEA Group Meeting	**May 2024**
Zhejiang University, Colloquium	**Sep 2023**
Peking University, KIAA-DoA Seminar	**Aug 2023**
Tsinghua University, Departmental Seminar	**Aug 2023**
UIUC, local group meeting	**May 2023**
Yale University, Galaxy Lunch Talk	**Apr 2023**
MIT, Brown Bag Lunch Talk	**Apr 2023**
NASA GSFC, X-ray Astrophysics Laboratory AGN Seminar (Virtual)	**Feb 2023**
CfA, High Energy Seminar	**Feb 2023**
Arizona State University, Cosmology Seminar	**Dec 2022**
University of Arizona, Steward Observatory/NOIRLab Galaxy group seminar	**Dec 2022**
MIT, High Energy Astro Group seminar (Virtual)	**Apr 2022**
Clemson University, Local Group seminar	**Apr 2022**
INAF OAS, Bologna, X-ray group seminar	**Sep 2019**

Contributed Talks

AXIS Community Science Conference	Maryland, **Apr 2025**
High Energy Astrophysics Division 21th Meeting	Texas, **Apr 2024**

243st AAS Meeting — New Orleans, **Jan 2024**
High Energy Astrophysics Division 20th Meeting — Hawaii, **Mar 2023**
241st AAS Meeting — Seattle, **Jan 2023**
NuSTAR 2022 Conference — Italy, **June 2022**
New England Regional Quasar and AGN Meeting — Connecticut, **May 2022**
High Energy Astrophysics Division 19th Meeting (*Poster*) — Pittsburgh, **Mar 2022**
Black Hole Across Space and Time — Virtual, **Dec 2021**
238th AAS Meeting — Virtual, **June 2021**
237th AAS Meeting — Virtual, **Jan 2021**
Supermassive Black Holes Meeting — Virtual, **Dec 2020**
235th AAS Meeting — Honolulu, **Jan 2020**
X-ray Astronomy 2019 Meeting (*Poster*) — Bologna, Italy, **Sep 2019**
High Energy Astrophysics Division 17th Meeting (*Poster*) — Monterey, **Mar 2019**
233rd AAS Meeting — Seattle, **Jan 2019**

Mentoring & Assistant Experience

Co-supervision of Clemson graduate student R. Silver (NASA Postdoc Fellow) — **2019-**
Co-supervision of Clemson graduate student A. Pizzetti (ESO Fellow) — **2019-2024**
Co-supervision of Clemson undergraduate students D. Cole and Z. Hu — **2019**
Research Assistant, Clemson — **2018-2020**
Teaching Assistant (PHYS 2230), Clemson — **2016-2017**

Workshops & Schools

CSST summer school at Peking University — Beijing, China, **July 2023**
Summer School for Astrostatistics at Penn State — State College, **Jun 2023**
End-to-end Simulations with SIXTE Workshop — Virtual, **Mar 2022**
2022 Submillimeter Array Interferometery School — Virtual, **Jan 2022**
Winter School at University of Freiburg — Freiburg, Germany, **Feb 2015**
Summer School at University of California, Berkeley — Berkeley, **Jun-July 2014**

Press Release

Webb Glimpses Field of Extragalactic PEARLS, Studded With Galactic Diamonds — **2022**

Outreach

- The Silk Road Cameleers Series (Introduce AGN to Undergrads) — Remote**, Apr, 2024**

† Volunteer to teach astronomy and mathematics to elemental and high school students in the rural area of China — Qiajia, **Summer, 2023**

† Translate Sensing Dynamic Universe project into Chinese (help people with visual disability accessible to the dynamic Universe with sonified astromical light curves and spectra) **2022-2023**

References

- Marco Ajello, PhD supervisor, majello@g.clemson.edu
- Francesca Civano, postdoc supervisor, francesca.m.civano@nasa.gov
- Martin Elvis, postdoc co-supervisor, melvis@cfa.harvard.edu
- Stefano Marchesi, PhD co-supervisor, stefano.marchesi@inaf.it
- Yue Shen, postdoc supervisor, shenyue@illinois.edu
- Daniel Stern, postdoc co-supervisor, daniel.k.stern@jpl.nasa.gov

Publication List

A total of **33** peer-reviewed papers, **5** submitted papers **ADS**

- First-author papers

7) **X. Zhao**, S. Marchesi, M. Ajello, et al., 2024, ApJ, 975, 24
An X-ray Significantly Variable, Luminous, Type 2 Quasar at z = 2.99 with a Massive Host Galaxy

6) **X. Zhao**, F. Civano, C. N. A. Willmer, et al., 2024, ApJ, 965, 188
PEARLS: The NuSTAR and XMM-Newton extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field II

5) **X. Zhao**, F. Civano, F. M. Fornasini, et al. 2021, MNRAS, 508, 5176
The NuSTAR extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field

4) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2021, A&A, 650, A57
The properties of the AGN torus as revealed from a set of unbiased NuSTAR observations

3) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2020, ApJ, 894, 71
A broadband X-ray study of a sample of AGNs with [OIII] measured inclinations

2) **X. Zhao**, S. Marchesi, M. Ajello, 2019, ApJ, 871, 182
Compton-thick AGN in the NuSTAR Era. IV. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in ESO 116-G018

1) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2019, ApJ, 870, 60
Compton-thick AGNs in the NuSTAR Era. II. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in NGC 1358

- Significantly contributed papers and mentored students* paper

13) *R. Silver, F. Civano, **X. Zhao**, Submitted to AAS journals
PEARLS: NuSTAR and XMM-Newton Extragalactic Survey of the JWST North Ecliptic Pole Time-Domain Survey III

12) *A. Pizzetti, et al. (including **X. Zhao**), 2025, ApJ, 979, 170
Hydrogen column density variability in a sample of local Compton-thin AGN II

11) F. Civano, **X. Zhao**, P. Boorman, et al., 2024, Front. Astron. Space Sci., 1340719
The High Energy X-ray Probe (HEX-P): X-ray population contributing to peak of the Cosmic X-ray background

10) E. Kammoun, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1308056
The High Energy X-ray Probe (HEX-P): Probing the physics of X-ray corona in active galactic nuclei

9) N. Torres-Albà, M. Stefano, **X. Zhao**, et al., 2023, A&A, 678, A154
Hydrogen Column Density Variability in a sample of local Compton-thin AGN

8) *R. Silver, N. Torres-Albà, **X. Zhao**, et al., 2023, A&A, 675, A65
A New Mid-Infrared and X-ray Machine Learning Algorithm to Discover Compton-thick AGN

7) *R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, ApJ, 940, 148
Compton-thick AGN in NuSTAR Era. IX: joint NuSTAR and XMM-Newton analysis of four local AGN

6) *A. Pizzetti, et al. (including **X. Zhao**), 2022, ApJ, 936, 149
A multi-epoch X-ray study of the nearby Seyfert 2 galaxy NGC 7479: Linking column density variability to the torus geometry

5) S. Marchesi, **X. Zhao**, N. Torres-Albà, et al. 2022, ApJ, 935, 114
Compton-Thick AGN in the NuSTAR era VIII: A joint NuSTAR-XMM-Newton monitoring of the changing-look Compton-thick AGN NGC 1358

4) *R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, ApJ, 932, 43
Chandra Follow-up Observations of Swift-BAT-selected AGNs II

3) N. Torres-Albà, S. Marchesi, **X. Zhao**, et al. 2021, ApJ, 922, 252
Compton-thick AGN in NuSTAR Era VI: The Observed Compton-thick Fraction in the Local Universe

2) S. Marchesi, M. Ajello, **X. Zhao**, et al. 2019, ApJ, 882, 162
Compton-thick AGNs in the NuSTAR Era. V. Joint NuSTAR and XMM-Newton Spectral Analysis of Three "Soft-gamma" Candidate CT-AGNs in the Swift/BAT 100-month Catalog

1) S. Marchesi, M.Ajello, **X. Zhao**, et al. 2019, ApJ, 872, 8
Compton-thick AGNs in the NuSTAR Era. III. A Systematic Study of the Torus Covering Factor

- Co-author papers

18) S. Creech, et al. (including **X. Zhao**), Submitted to AAS journals
Spectral analysis of Hard X-ray Selected AGN in the NEP Field

17) I. Cox, et al. (including **X. Zhao**), Submitted to AAS journals
A systematic search for AGN obscuration variability in the Chandra archive

16) A. Banerjee, et al. (including **X. Zhao**), Submitted to AAS journals
Contemporaneous X-ray and Optical Polarization of EHSP Blazar H 1426+428

15) K. Imam, et al. (including **X. Zhao**), Submitted to AAS journals
Source Identification for the Swift-BAT 150 Month Hard X-ray Catalog using Observations from Soft X-ray missions

14) D. Sengupta, et al. (including **X. Zhao**), 2025, A&A, 697, A78
A Multi-Wavelength Characterization of the Obscuring Medium at the Center of NGC 6300

13) N. Torres-Albà, et al. (including **X. Zhao**), 2025, ApJ, 981, 91

Swift-XRT and NuSTAR Monitoring of Obscuration Variability in Mrk 477

12) I. Cox, et al. (including **X. Zhao**), 2025, ApJ, 979, 130
Chandra Follow-up Observations of Swift-BAT-Selected AGNs III

11) J. García, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci.,1471585
The High Energy X-ray Probe (HEX-P): Science Overview

10) N. S. Khatiya, et al. (including **X. Zhao**), 2024, ApJ, 971, 84
Characterizing the γ-ray Emission from FR0 Radio Galaxies

9) R O'Brien, et al. (including **X. Zhao**), 2024, ApJS, 272, 19
TREASUREHUNT: Transients and Variability Discovered with HST in the JWST North Ecliptic Pole Time Domain Field

8) P. Boorman, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1335459
The High Energy X-ray Probe (HEX-P): Probing the circum-nuclear environment in AGN down to extremely low luminosities

7) I. Cox, et al. (including **X. Zhao**), 2023, ApJ, 958, 155
A simple method to predict N_H variability in active galactic nuclei

6) S. P. Willner, et al. (including **X. Zhao**), 2023, ApJ, 958, 176
PEARLS: JWST counterparts of micro-Jy radio sources in the Time Domain field

5) C. N. A. Willmer, et al. (including **X. Zhao**), 2023, ApJS, 269, 21
PEARLS: Near Infrared Photometry in the JWST North Ecliptic Pole Time Domain Field

4) Q. Yang, et al. (including **X. Zhao**), 2023, ApJ, 953, 61
Probing the Origin of Changing-look Quasar Transitions with Chandra

3) D. Sengupta, et al. (including **X. Zhao**), 2023, A&A, 676, A103
Compton-thick AGN in the NuSTAR Era IX: Analysis of seven local CT-AGN candidates

2) R. A. Windhorst, et al. (including **X. Zhao**), 2023, AJ, 165, 13
Webb's PEARLS: Prime Extragalactic Areas for Reionization and Lensing Science: Project Overview and First Results

1) A. Traina, et al. (including **X. Zhao**), 2021, ApJ, 922, 159
Compton-Thick AGN in the NuSTAR era VII: a joint NuSTAR, Chandra and XMM-Newton analysis of two nearby, heavily obscured sources